

Logistics

REPAIR AND CALIBRATION OF TEST, MEASUREMENT AND DIAGNOSTIC EQUIPMENT

This instruction outlines responsibilities and procedures applicable to the Precision Measurement Equipment Laboratory (PMEL) and all unit commanders, staff sections, maintenance officers, supervisors, and PMEL coordinators at all levels of command that require support from the PMEL.

SUMMARY OF CHANGES: This revision reflects a revision in the PMEL Automated Management System (PAMS) computer program and the change from AETCR 66-11 to AETCI 21-101, *Maintenance Management of Aerospace Equipment*.

1. Responsibilities:

1.1. PMEL MATERIAL CONTROL (MC): The PMEL MC coordinates the support for test, measurement and diagnostic equipment (TMDE) for PMEL, contracts and depots.

1.2. Owing Work Centers (OWC): OWC have overall management of TMDE and care and handling of all TMDE assigned or used. OWC supervisors and PMEL coordinators are to be familiar with the contents of T.O.s 33-1-27, *Logistic Support of Precision Measurement Equipment*; 33K-1-100-1, *TMDE Calibration Notes Maintenance Data Collection Codes Calibration Measurement Summaries Transportable Field Calibration Unit Configurations and Automatic Calibration System Supportable Equipment*; and 33K-1-100-2, *TMDE Calibration Interval Technical Order and Work Unit Code Reference Guide*, as they pertain to the repair and calibration of TMDE.

1.3. PMEL: The PMEL is responsible for the repair, calibration and certification of all TMDE designated in T.O. 33K-1-100-1 or other proper authority.

1.4. Communication, Navigation, Instrument, Electric (CNIE) Shop: The CNIE Shop is responsible for the repair, calibration, and certification of all TMDE designated in AETCI 21-101, or other proper authority.

1.5. Performing Work Center (PWC): Each OWC that possesses peculiar equipment is designated as a PWC and is responsible for scheduling, repair, calibration, and certification of those items within its area of responsibility.

1.6. Production Control (PC): The Repairable Asset Monitors, Schedulers (RAMS) schedule calibration and repair for other PWC's in the Director of Maintenance (DOM) organization.

1.7. Unit commanders, staff sections, maintenance officers, flight chiefs, supervisors and PMEL coordinators at all levels of command that possess TMDE are responsible for ensuring compliance with this instruction.

Supersedes 47 FTWR 74-1, 15 July 1991
(See Above for Summary of Changes)

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2. Procedures:

2.1. PMEL MC:

2.1.1. Prepares a letter for the Director of Maintenance, addressed to the appropriate unit commander or LCSAM flight manager, identifying OWC's which did not deliver or make arrangements for delivery of scheduled TMDE within three workdays after date due calibration (DDC). TMDE cannot be used after DDC has passed.

2.1.2. Distributes monthly and quarterly listings to OWC's and PWC's. Makes all necessary corrections to the TMDE master file upon return of corrected listings from the OWC's.

2.1.3. Ensures that all dirty or incomplete TMDE are brought to the attention of OWC PMEL coordinator and may be refused by PMEL MC if the situation warrants. Ensures that all exterior connectors or ports are capped and that extra fittings or connectors are removed. Items showing abuse or neglect are reported to the unit commanders or LCSAM flight manager.

2.1.4. Determines calibration responsibility for all TMDE with assistance of PMEL supervisor or PMEL Quality Assurance.

2.1.5. Prepares DD Form 1149, **Requisition and Invoice/Shipping Document**, for items due calibration at another agency.

2.1.6. Schedules and checks for compliance with TMDE Due Calibration Schedule. (On occasion, some items maybe called in early calibration or PMEL coordinators may as informed to hold items depending upon the PMEL workload.)

2.1.7. Keeps close liaison with designated PMEL coordinators of all OWC. Gives and receives information relating to TMDE.

2.1.8. Notifies the OWC within five days of a change in item status.

2.1.9. The PMEL MC will notify OWC's of unacceptable status or estimated delivery dates (EDD) greater than 90 days. The OWC should contact PMEL MC to determine a course of action for TMDE parts requisitions which have an unacceptable status or EDD beyond 90 days from the requisition date. Determination on Not Repairable This Station (NRTS) and replacement action are based on mission requirements and availability of replacement assets. Communication between the OWC and PMEL is essential for timely parts receipt. PMEL MC section forwards mission impact statements to Stock Control Section (47 LS/LGSMS) for follow-up action.

2.1.10. Signs a hand receipt prepared by the PMEL Automated Management Subsystem (PAMS) computer in two copies. The PMEL copy stays with the TMDE and the customer copy is used to pick up the TMDE when calibration/repair has been completed.

2.2. OWC:

2.2.1. Each OWC appoints a primary and alternate PMEL coordinator. The appointment must be in memorandum format (two copies) and signed by the OWC's flight chief. One copy is sent to PMEL MC (47 OG/MACB) and the other is kept in the OWC PMEL coordinator's folder.

2.2.2. Each OWC PMEL coordinator maintains a PMEL folder. As a minimum, the folder contains:

2.2.2.1. A current copy of this instruction.

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2.2.2.2. PMEL Coordinator memorandum of appointment.

2.2.2.3. PMEL Master ID List.

2.2.2.4. TMDE Equipment Due Calibration Schedule.

2.2.2.5. TMDE hand receipts from PMEL (signed and dated PAMS - PMEL hand receipt).

2.2.2.6. OWC copies of active AFTO Form 163, **Request for Limited/Special Calibration (TMDE)**.

2.2.3. Ensure compliance with equipment forecast. Check the TMDE Equipment Due Calibration Schedule daily. Have all TMDE scheduled for calibration delivered on the date due. TMDE that becomes due on Saturday or Sunday is coordinated with PMEL MC.

2.2.4. The PMEL coordinators receive two copies of the TMDE Due Calibration Schedule the latter part of each month. They review each line entry for accuracy and annotate any errors on the schedule, paying particular attention to the ID number, part/model number, serial number, DDC. Return a signed and corrected copy before the beginning of the following month; and file the other copy in the PMEL folder. When the DDC on the certification label (AFTO Forms: 99, **Limited/Special TMDE Certification**; 108, **TMDE Certification**; 394, **TMDE Certification**; 398, **Limited TMDE Certification**) has been exceeded, the coordinator ensures the TMDE is not used and has the TMDE delivered to the appropriate scheduler.

2.2.5. Coordinators receive two copies of the PMEL Master ID List quarterly. Check for accuracy and note changes on the listing. Within five workdays of receiving the PMEL Master ID List, forward a corrected copy to the PMEL MC, and file the second copy in the PMEL folder.

2.2.6. To add an item to the PMEL Master ID List, the OWC PMEL coordinator fills out:

2.2.6.1. An AFTO Form 350, **Repairable Item Processing Tag**, with blocks 3, 3a, 4, 5, 10, 11, 12 and 14 properly filled out and attached to each item.

2.2.7. To delete an item after the quarterly PMEL Master ID List verification, the OWC submits a letter stating the reason for the deletion. The letter must be signed by the flight manager. This applies to equipment that is not being deleted by PMEL MC.

2.2.8. For unscheduled items, the OWC coordinator fills out: an AFTO Form 350, with blocks 2, 3, 3a, 4, 5, 7, 9, 10, 11, 12 and 14 properly filled out and attached to each item.

2.2.9. Primary and alternate PMEL coordinators are to attend a briefing on the rules required to keep their TMDE up-to-date.

2.2.10. The OWC's may perform organizational maintenance on assigned TMDE. Excluded is any work that would require internal adjustments or replacements of parts or components that affect calibration or certification of the equipment.

2.2.11. The PMEL coordinators will return the PAMS hand receipt when picking up their TMDE.

2.2.12. The OWC ensures that the limited calibration labels are signed by the supervisor of the user organization or his designated representative.

2.2.13. In coordination with PMEL MC, the OWC delivers or picks up equipment between 0800 - 1100, Monday through Friday.

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2.3. Priority calibration/repair:

2.3.1. This policy is designed to provide equal service to all OWC's and provide efficient work flow through the laboratory. Strict compliance with the policy is required by all OWC's to ensure effective PMEL operation, reduce backlog, and provide all OWC's with calibrated equipment on a timely basis.

2.3.2. Types of priorities:

2.3.2.1. Emergency: This priority is used for repair of TMDE which renders an operational weapons system ineffective or operationally out of commission. TMDE is processed into the laboratory immediately and work continues, including approved overtime, until the TMDE is serviceable/calibrated or in an equipment inoperative for parts (EIP) status. This priority is intended for emergency situations only and is not granted for scheduled calibrations. If overtime is required, one technician from the OWC remains in the laboratory to ensure compliance with the two-person concept, offer technical advice, and return the TMDE to the work center after maintenance.

2.3.2.2. Mission Essential: This priority is used for TMDE which is urgently needed to support mission requirements. This priority virtually guarantees minimum turn-around time, usually one day or less. We solicit the cooperation of OWC supervisors to ensure that TMDE is submitted to the PMEL as early as possible on the date due calibration, preferably before 0800. Mission essential TMDE is processed into the laboratory next, ahead of lower priority TMDE. Overtime is not expended on this TMDE.

2.3.2.3. Routine: All other scheduled TMDE.

NOTE: Initial calibration requests and TMDE overdue calibration are scheduled after all other TMDE.

2.3.3. Work center supervisors review their TMDE Due Calibration Schedule to identify priority TMDE due scheduled calibration. Particular attention is paid to TMDE due calibration on weekends and holidays. The PMEL coordinator is to contact PMEL MC before the TMDE is due calibration.

2.3.4. Emergency/mission essential TMDE is accepted at any time.

2.3.5. All emergency/mission essential requests are delivered to the PMEL MC with a letter requesting priority service signed by the OWC commander, maintenance officer, superintendent, or flight manager. This letter is to contain a mission impact statement and the name and phone number of a technician familiar with the TMDE. The OWC is notified when the item is complete or it enters EIP status. Completed emergency/mission essential TMDE is to be picked up within one hour of notification from PMEL MC. Unit commanders or LCSAM flight managers are notified of OWC's failure to pick up completed priority TMDE.

2.3.6. Abuse of the priority system causes production backlog in the PMEL. OWC's should consider alternate methods of accomplishing the required measurements or the use of substitute or borrowed test equipment before requesting priority services. The OWC must determine beyond a doubt that the TMDE requires priority service and that no like or substitute TMDE is available from another OWC. PMEL MC can assist in identifying OWC's that possess like items. Equipment loans or transfers of custody are the prerogative of the custodians involved.

2.3.7. The PMEL supervisor is the approval authority for all priority work requests.

2.3.8. Multiple priorities are treated in chronological order. Cooperation between the OWC supervisor and the PMEL is essential to ensure that all TMDE is processed in manner most likely to enhance successful mission accomplishment.

2.4. Request for limited/special calibration:

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2.4.1. The OWC supervisor or the PMEL Coordinator completes an AFTO Form 350 for TMDE requiring limited calibration, no periodic calibration required (NPC) designation, or calibrate before use (CBU) designation.

2.4.1.1. Most of the TMDE is calibrated to much closer tolerances than the operation requires. In addition, there are many cases when the PMEL expends a great deal of time and effort calibrating functions of TMDE that are never used. In the absence of specific instructions from the user, PMEL technicians work on the TMDE until it meets all of the manufacturer's specifications for all of the calibrated parameters. T.O. 00-20-14, *Air Force Metrology and Calibration Program*, authorizes the PMEL to calibrate only those ranges or functions actually used to the accuracy actually required. When a limited calibration is requested, the PMEL calibrates the item to the requested specifications and indicates the limited calibration by certifying the item with an AFTO Form 99, Limited/Special TMDE Certification, or an AFTO Form 398, Limited TMDE Certification. The limited calibration remains in effect until rescinded by the owner. Aggressive use of limited calibration improves the turn-around time of TMDE.

2.4.1.2. Designating a calibrated item as NPC: TMDE may be designated as NPC by the owner/user if its performance is verified, checked or monitored by calibrated external or internal TMDE; or if it is not used to support mission critical systems/equipment, does not affect safety, or is not used to verify TMDE performance factors. The PMEL supervisor or Quality Assurance inspector can help make this determination.

2.4.1.3. Designating a calibrated item as CBU. If an item is normally not used during its calibration cycle, the owner/user may designate the item as CBU. It may remain in this category indefinitely. It must not be used after the DDC until it has been calibrated.

2.4.2. Upon request, the OWC provides the required parameters/specifications for any given unit of TMDE. This allows the PMEL to calibrate TMDE to the user's system requirements, saving considerable time and money.

2.4.3. Occasionally, when an item does not meet a required specification, the PMEL technician asks permission to calibrate the item to a reduced accuracy. If the organization agrees, the technician initiates an AFTO Form 99 or AFTO Form 398.

2.4.4. Limited calibrations are to be indicated by using AFTO Forms 99 or 398. These forms may also be initiated if:

2.4.4.1. A calibration chart has been prepared.

2.4.4.2. The TMDE has been calibrated to less than the manufacturer's stipulated accuracy's (although it complies with an approved AF calibration procedure).

2.4.4.3. Limited PMEL capability.

2.4.5. The AFTO Form 99/398 must be signed by the supervisor of the user organization or designated representative. The AFTO Form 99 is to be signed in the User Approval block, and the AFTO Form 398 is to be signed on the Date Due line following the date due, NPC and the date due/CBU information or initialed in the INI block.

2.5. All No Calibration Required (NCR) items require marking in accordance with T.O. 00-20-14. Only NCR items which have limited or full repair capability are to be listed on the PMEL Master ID List.

2.6. After calibration/repair, the PWC's notifies their TMDE scheduler to update the Master ID Lists.

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2.7. Oxygen TMDE (including LOX): Work centers having oxygen TMDE are to comply with the inspection and cleaning procedures in T.O. 37C11-1-1, *Maintenance Cleaning of Pressure Gauges used on Liquid Oxygen Systems*, or T.O.15X-1-102, *General Care and Cleaning of Oxygen Gauges and Oxygen Device Related Test Equipment*, prior to turn-in for calibration, and they are to fill out block 14 of an AFTO Form 350. TMDE not in compliance with the specified standards is not accepted by the PMEL.

2.8. Technical data on TMDE: PMEL is not required to keep technical data for unique systems, one-of-a-kind commercial equipment, or special purpose limited usage equipment. OWC's must requisition and keep data for TMDE in these categories. Upon request, the OWC sends the data to PMEL. If data is not available, the equipment is returned to the OWC and rescheduled upon receipt of the technical data.

2.9. TMDE received from Supply: OWC's receiving TMDE from Supply are to leave all tags and Supply forms/documents attached to the unit. The OWC will retain the shipping materiel and packing for possible Materiel Deficiency Report (MDR) action. If the TMDE is determined to be defective during initial calibration, the following procedures will apply:

2.9.1. Test equipment issued from depot stock or shipped from a manufacturer is processed in accordance with T.O. 00-35D-54, *USAF Material Deficiency Reporting and Investigating System (CAT II MDR)*.

2.9.2. If warranty repair is available on a new item, the item is returned to the OWC for processing. PMEL will furnish technical details of rejection or failure as well as warranty and processing information.

2.9.3. (Alternate) If warranty repair is available on a new item, PMEL will process all the paperwork and ship the item to the appropriate repair facility.

3. Explanation of Terms:

3.1. TMDE. Equipment that is used to troubleshoot or perform functional test or calibration on weapon systems, aircraft, their subsystems, or the equipment in support of these systems while on the ground. This category includes aircraft/engine test cells, shop test stands, nondestructive inspection equipment (NDI), electrical test sets, precision measurement equipment (PME), weapons systems or aircraft mock-ups, associated electric/electronic supporting equipment, Automatic Test Equipment (ATE), stationary hydraulic test stands, and any other equipment as designated in 33K-1-100-1..

3.2. PMEL Coordinator: The PMEL Coordinator serves as the vital link between PMEL and the OWC. The PMEL Coordinator obtains calibration support for the activity, keeps the OWC informed as to the status of their TMDE, and provides advice for the commander and supervisor. Normally, all communications from the OWC to the PMEL go through the PMEL Coordinator.

3.3. Scheduled TMDE: All items of TMDE that appear on the current TMDE Due Calibration Schedule.

3.4. Unscheduled TMDE: All items of TMDE requiring repair or calibration that do not appear on the TMDE Due Calibration Schedule.

3.5. Initial Calibration: All TMDE received initially from Supply or other sources.

3.6. TMDE Due Calibration Schedule: A report produced monthly that reflects all TMDE due calibration during the scheduled period. All assigned equipment, categories 1-4, are listed on the OWC schedules. PMEL is responsible for equipment categories 1, 3 and 4. Category 2 TMDE is supported by PMEL when designated as PMEL/User or PMEL in T.O. 33K-1-100-2.

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3.7. PMEL Master ID List: This is a listing of categories 1-4 equipment. The PAMS PMEL Master ID List contains TMDE supported by PMEL. Core Automated Maintenance System (CAMS) and other Master lists are of TMDE supported by other PWC's.

3.8. NPC required. TMDE that is not used to verify performance factors in support of critical equipment and support equipment can be designated NPC. TMDE used just to indicate a signal presence or make a measurement requiring no accuracy verification may be designated NPC. NPC equipment is to be identified on the PMEL Master ID List as "NPC".

3.9. Calibrate Before Use (CBU): TMDE that is seldom used may be designated CBU. Items designated CBU must be calibrated prior to use after the DDC. CBU equipment is to be identified on the PMEL Master ID List as "CBU".

3.10. Limited Calibration: Multifunction TMDE can be limited to only those functions actually used to meet job requirements.

3.11. Item Status : The Item Status column on the PMEL Master ID List and the P ST column on the TMDE due calibration schedule. These columns are for information of a permanent nature about the TMDE.

Item Status	Discription
D	Depot maintained TMDE. This item is sent to a depot for calibration
I the	Exception to a calibration interval. This item is on an interval different than one listed in T.O. 33K-1-100-2 or the interval is determined by the notes in T.O.33K-1-100-1.
O	Onsite calibration PMEL calibrates this item at your work center.
P	This item is calibrated at a Type II PMEL, for Type IV PMEL use.
S	This item is in storage and is not in use.
T	This item is calibrated using a Transportable Field Calibration Unit.
W	War Readiness Material (WRM). This item is a part of a mobility kit.
Y	This item is at a TDY/mobility location.
0-9	Local use.

3.12. ST and Remarks columns on the TMDE Due Calibration Schedule: These columns are for information on a temporary nature about the TMDE.

ST	Remarks	Discription
A	Awaiting Mnt	Item Awaiting Maintenance (AWM) at PMEL
C	Item In work	Item In work
E	AWM From DEF	Item AWM after being deferred from maintence
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F	Item for QPR	Item calibrated, but awaiting Quality Process Review
L	Defrd-Parts	Item deferred, parts are on order (EIP)
N	Defrd-Tech	Item deferred for technical Data
O	Cust-Hold	Item on Customer Hold, coordinated with PMEL
P	Defrd-Misc	Item deferred to Miscellaneous Reasons, coordinated with PMEL
R	Contract Mnt	Item is under a Contract for maintenance/calibration/repair
S	Depot Cal	Item is at an off-base agency for calibration/repair
T	TCTO Due	A Time Compliance Technical Order is due on or before the next scheduled calibration
U	MDR	Item on hold for Materiel Deficiency Report (MDR) processing
V	Inserv AWP	Item useable at the customer location with parts on order, In-Service EIP
W	MDR Exhibit	Item on hold as a MDR Exhibit
X	Reserved Code	Reserved
Y	Reserved Code	Reserved
Z	Awtng Cstmr	Item is awaiting customer pickup
I		Item at customer location.

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Attachment

1. Glossary of Abbreviations

GLOSSARY OF ABBREVIATIONS

AGMC	Aerospace Guidance and Metrology Center
CAMS	Core Automated Maintenance System
CBU	Calibrate Before Use
CNIE	Communication, Navigation, Instrument, Electric
DDC	Date Due Calibration
DOM	Director of Maintenance
EDD	Estimated Delivery Date
EIP	Equipment Inoperative for Parts
MDR	Materiel Deficiency Report
AFMETCAL	Air Force Metrology and Calibration
NCR	No Calibration Required
NDI	Nondestructive Inspection
NPC	No Periodic Calibration
NRTS	Not Repairable This Station
OWC	Owning Work Centers
PAMS	PMEL Automated Management System
PME	Precision Measurement Equipment
PMEL	Precision Measurement Equipment Laboratory
PST	Permanent Status
PWC	Performing Work Center

TS	Temporary Status
TFCU	Transportable Field Calibration Unit
TMDE	Test, Measurement and Diagnostic Equipment